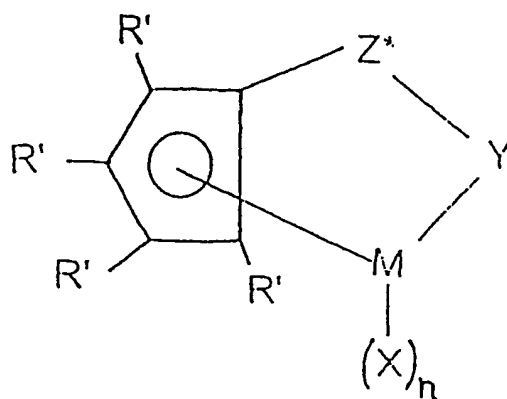


## Claims

1. A process for the copolymerisation of ethylene and an  $\alpha$ -olefin having 7 to 10 carbon atoms in a fluidised bed gas phase reactor in the presence of a single site polymerisation catalyst *characterised in that* said process is operating in condensed mode and wherein the amount of said  $\alpha$ -olefin is maintained below that at which  
5 substantial condensation in the reactor occurs.
2. A process according to claim 1 wherein the partial pressure of ethylene in the reactor is in the range 0.5 to 2 Mpa.
3. A process according to either of the preceding claims wherein the  $\alpha$ -olefin is 1-octene.
- 10 4. A process according to claim 3 wherein the ratio of 1-octene/ethylene partial pressure is in the range 0.0001 to 0.02.
5. A process according to claims 1 or 2 wherein the  $\alpha$ -olefin is 1-decene.
6. A process according to claim 5 wherein the ratio of 1-decene/ethylene partial pressure is in the range 0.00005 to 0.005.
- 15 7. A process according to any of the preceding claims wherein the process is continuous.
8. A process according to any of the preceding claims wherein the single site polymerisation catalyst is a metallocene complex.
9. A process according to claim 8 wherein the metallocene complex has the general  
20 formula



wherein:-

5                   R' each occurrence is independently selected from hydrogen, hydrocarbyl, silyl, germyl, halo, cyano, and combinations thereof, said R' having up to 20 nonhydrogen atoms, and optionally, two R' groups (where R' is not hydrogen, halo or cyano) together form a divalent derivative thereof connected to adjacent positions of the cyclopentadienyl ring to form a fused ring structure;

10                  X is hydride or a moiety selected from the group consisting of halo, alkyl, aryl, aryloxy, alkoxy, alkoxyalkyl, amidoalkyl, siloxyalkyl etc. having up to 20 non-hydrogen atoms and neutral Lewis base ligands having up to 20 non-hydrogen atoms,

Y is -O-, -S-, -NR\*-, -PR\*-,

15                  M is hafnium, titanium or zirconium,

Z\* is SiR\*<sub>2</sub>, CR\*<sub>2</sub>, SiR\*<sub>2</sub>SIR\*<sub>2</sub>, CR\*<sub>2</sub>CR\*<sub>2</sub>, CR\*=CR\*, CR\*<sub>2</sub>SIR\*<sub>2</sub>, or

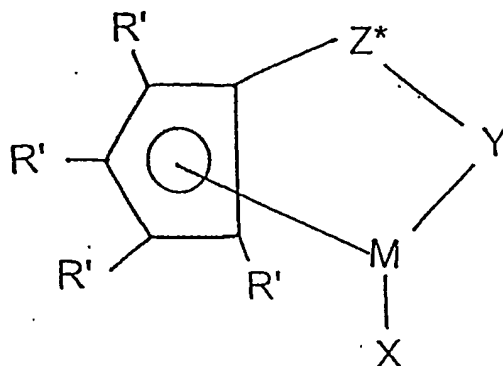
GeR\*<sub>2</sub>, wherein:

R\* each occurrence is independently hydrogen, or a member selected from hydrocarbyl, silyl, halogenated alkyl, halogenated aryl, and combinations thereof, said

20                  R\* having up to 10 non-hydrogen atoms, and optionally, two R\* groups from Z\* (when R\* is not hydrogen), or an R\* group from Z\* and an R\* group from Y form a ring system.,

and n is 1 or 2 depending on the valence of M.

10.       A process according to claim 8 wherein the metallocene complex has the general  
25       formula



wherein:-

- R' each occurrence is independently selected from hydrogen,  
 5 hydrocarbyl, silyl, germyl, halo, cyano, and combinations thereof, said R' having up to 20 nonhydrogen atoms, and optionally, two R' groups (where R' is not hydrogen, halo or cyano) together form a divalent derivative thereof connected to adjacent positions of the cyclopentadienyl ring to form a fused ring structure;

- X is a neutral  $\eta^4$  bonded diene group having up to 30 non-hydrogen  
 10 atoms, which forms a  $\pi$ -complex with M;

Y is -O-, -S-, -NR\*-, -PR\*-,

M is titanium or zirconium in the + 2 formal oxidation state;

Z\* is  $\text{SiR}^*_2$ ,  $\text{CR}^*_2$ ,  $\text{SiR}^*_2\text{SiR}^*_2$ ,  $\text{CR}^*_2\text{CR}^*_2$ ,  $\text{CR}^*=\text{CR}^*$ ,  $\text{CR}^*_2\text{SiR}^*_2$ , or  $\text{GeR}^*_2$ , wherein:

- 15 R\* each occurrence is independently hydrogen, or a member selected from hydrocarbyl, silyl, halogenated alkyl, halogenated aryl, and combinations thereof, said R\* having up to 10 non-hydrogen atoms, and optionally, two R\* groups from Z\* (when R\* is not hydrogen), or an R\* group from Z\* and an R\* group from Y form a ring system.

- 20 11. A process according to either of claims 9 or 10 wherein the metal M is titanium.